Implementation of Lean in Raw Mill Separator Air Slide to Eliminate Non Value Components

Mr. Susheem Nonhare [1] Mr. Devesh Shrivastava [2]
[1]M Tech Scholar [2]Professor
[1,2]Department of Mechanical Engineering
[1,2]BIT Durg, C.G., India

Abstract— The paper presents the method to implement lean in the raw mill separator air slide, an equipment used in cement industry. Lean is a philosophy that is driven by the ideas to eliminate the non-value activities or components in any process. Hence, in this paper, some modifications in the raw mill separator air slide are carried out in order to eliminate the non-value components in the equipment. The elimination is done to reduce the overall cost of the equipment and make the process cost effective.

Keywords: lean, raw material separator, non-value component

I. INTRODUCTION

A. Background

Lean is a process management philosophy. Lean aims to produce products and services through using the minimum levels of all factors, like minimum capital investment, minimum human efforts and minimum wastes. The key element in Lean strategy is to develop a learning system that has the ability to identify and distinguish between value added activities and wastes. Implementation of lean has helped many organizations to improve their productivity and efficiency.

Lean grew up in Toyota family company. Toyota's view is that the main method of lean is not the tools, but the reduction of three types of waste: muda ("non-value-adding work"), muri ("overburden"), and mura ("unevenness"), to expose problems systematically and to use the tools where the ideal cannot be achieved. From this perspective, the tools are workarounds adapted to different situations, which explains any apparent incoherence of the above principles. In simple words, lean means creating more value for customers with fewer resources. A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer. An equipment, machine or a process can be made lean by modifying their design to achieve a considerable benefit in one or more aspects.

II. METHODOLOGY

A. General

The Raw Mill Separator Air Slide is an equipment used for transporting the materials from one point to another, through an air slide. The air slide is very slightly inclined, nearly 5 to 10 degrees. Therefore, the materials cannot slide through it automatically due to very less inclination. In order to transport the materials through it, a polyester cotton cloth is tied at the two ends of the air slide, and an air blower is installed below the air slide. The blower blows high pressure air at the cloth from beneath. The cloth rises up and thus provides a light, smooth and rising surface for the materials to travel. The materials are transported on the surface of the blowing cloth, all along through the slide path. The diagram for this design is shown below:

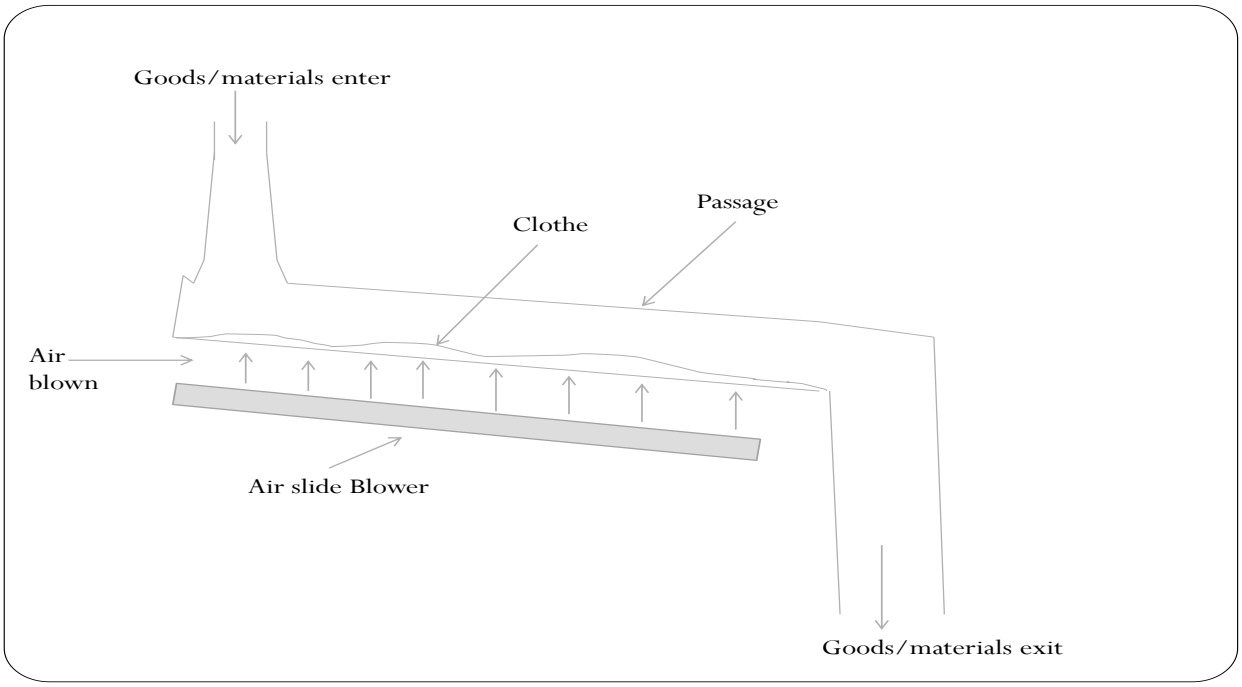

Fig. 2.1: Raw mill separator air slide.

The problem existing in this design is that the cloth tears due to overload of the materials. The cloth needs to be changed. A new piece of cloth is tied but there is risk that the new cloth will tear sometime in future. On an average,

the cloth is changed five times in a year, which results in high cost of maintenance. Furthermore, the cost of running the air blower is extremely high. Air blower is replaced every four months a year, i.e., three times in one year. In addition, the purchase cost of an air blower is also high.

Equipment	Cost of maintenance
Cost of running air blower	Rs. 2,25,000 per blower (3 blowers are used per year) total Rs.6,75,000
Cost of the changing clothe	Rs. 1,500 per clothe (clothe is changed 5 times per year) total Rs.7,500
Purchase cost of air blower	Rs. 45,000 per blower (air blower is replaced every four months in 1 year) total Rs.1,35,000
Maintenance cost of air slide (cleaning etc)	Rs. 8000 approx per annum
Total cost of the leading equipment	Rs. 8,25,000 per annum

Table 2.1: Results

Therefore, the non-value components in this equipment are the cloth and the air blower. It is proposed that both these components should be eliminated, to reduce the overall cost of equipment. This objective can be achieved by carrying out certain modification. It is proposed that the air slide should be tilted at higher angle, 45˚ approx, to provide an inclined slope for the materials to automatically flow through the slide. Now, there would be no necessity for cloth or air blower.

The modified design is shown below:

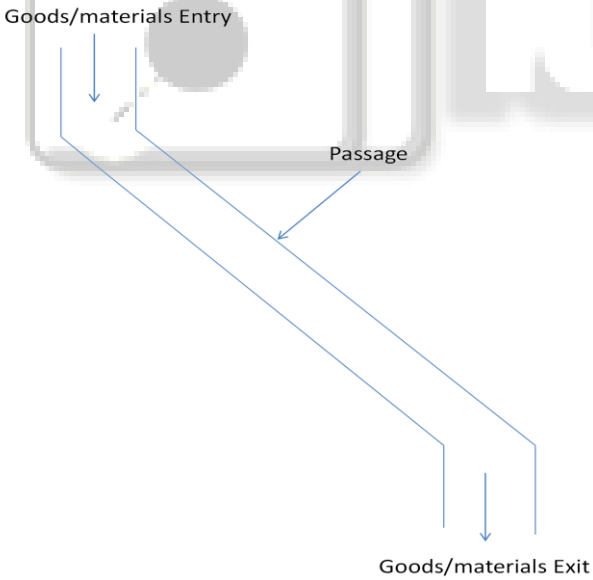

Fig. 2.2: Modified Drawing.

The materials enter the slide path from above and fall through the slide under natural gravity and exit from below. This simple but efficient design does not require high maintenance. Only the maintenance of the air slide is needed, like its cleaning etc. Hence, not much cost is involved in it.

III. Result

As a result of the elimination of the mentioned components, high cost can be saved. The cost of changing the cloth, the purchase cost of blower and running cost of blower are completely eliminated. Only the maintenance cost of the air slide will exist but it is very low. The result obtained is summarized below:

S.No.	Indicator	From	To
1.	Air slide cloth changing	5 times	0
2.	Air blower running cost	Rs. 6,75,000 (3 blowers)	0
3.	Total cost of clothes	Rs. 7,500	0
4	Purchase Cost of 3 air blowers	Rs. 1,35,000	0
5.	Maintenance cost of air slide	Rs. 8,000	Rs. 8,000

Table 3.1: Results.

Total cost saved = 8,25,000 – 8,000 = 8,17,000

Hence, an amount of Rs. 8.17 lacs is saved per year.

IV. Conclusion

It can be concluded that the modifications carried out as a part of the lean philosophy proved to be successful. Therefore, lean is a very easy but effective method to be implemented in an equipment or a machine or process to get beneficial results on many aspects

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